

2009 Washington Statewide Waste Characterization Study



Number of Samples by Sector

SECTOR	NUMBER OF SAMPLES
Commercial	164
Residential	148
Self-hauled C&D	109
Self-hauled	109
Total	530



Waste Generator Sectors

SECTOR	EST. PERCENTAGE OF DISPOSED WASTE STREAM	EST. TONS DISPOSED STATEWIDE
Commercial	43.7%	2,174,075
Residential	36.7%	1,826,521
Self-hauled C&D	7.5%	374,386
Self-hauled	12.1%	603,514
Totals	100.0%	4,978,496

Material List

Attachment B: Materials List

Washington State Waste Composition Study—Materials List, 2009

PAPER

Packaging Paper:

1. **Newspaper:** shredded newspaper packing material.
2. **Cardboard and Kraft Packaging:** unwaxed kraft paper corrugated containers and boxes, unless poly- or foil-laminated. Includes cardboard boxes and brown kraft paper bags and packaging paper.
3. **Other Groundwood Packaging:** other packaging made from groundwood paper, such as egg cartons.
4. **Mixed / Low-Grade Paper:** low-grade recyclable papers, including non-corrugated paperboard packaging, aseptic packaging, and polycoated paperboard packaging. Includes cereal and cracker boxes.
5. **Compostable Packaging:** packaging paper that can be composted such as pizza boxes and waxed cardboard boxes.
6. **Residual / Composite Paper:** non-recyclable and non-compostable types of papers such as paper packaging with metal or plastic parts (except aseptic packaging). Examples would include plastic lined or metal handled take-out food containers.

Non-packaging Paper

7. **Newspaper:** printed groundwood newsprint, including glossy ads and Sunday edition magazines that are delivered with the newspaper (unless these are found separately during sorting).
8. **Cardboard and Kraft Non-Packaging:** unwaxed kraft paper and corrugated products and, unless poly- or foil-laminated. Could include cat scratching pads.
9. **Magazines:** magazines, catalogs and similar products with glossy paper. Includes Sunday edition news magazines, if found separate from the newspaper.
10. **High-Grade Paper:** high-grade white or light-colored bond and copy machine papers and envelopes, and continuous-feed computer printouts and forms of all types, except multiple copy carbonless paper.
11. **Other Groundwood Non-Packaging:** non-packing products made from groundwood paper, including phone books, some tablet paper, and paperback books.
12. **Mixed / Low-Grade Paper:** low-grade recyclable papers, including colored papers, notebook or other lined paper, envelopes with plastic windows, non-corrugated paperboard, carbonless copy paper, and junk mail.
13. **Compostable, Non-packaging:** non-packaging papers that can be composted such as paper towels, paper cups, tissues, and paper plates.

130 Materials

Number of Material Types per Material Class

MATERIAL CLASSES	NUMBER OF MATERIAL TYPES WITHIN CLASS
Paper Packaging	6
Paper Products	9
Plastic Packaging	15
Plastic Products	11
Glass	6
Metal	9
Organics	9
Wood Wastes	8
Construction Materials	12
Consumer Products	17
Hazardous Wastes	24
Residues	4
Total	130

Hazardous and Special Wastes (1)

- Pesticides and Herbicides: Includes a variety of poisons whose purpose is to discourage or kill pests, weeds or microorganisms. Fungicides and wood preservatives, such as pentachlorophenol, are also included in this material.
- High-Intensity Discharge Lamps (HID): Includes high pressure sodium, metal halide and mercury vapor.
- Compact Fluorescent Lamps (CFL)
- Fluorescent Tubes: Includes linear, u-shaped, and circular.
- Asbestos: Pure asbestos and asbestos-containing products where the asbestos present is the most distinguishing characteristic of the material.
- Latex Paints: Water-based paints and similar products.
- Solvent-Based Adhesives/Glues: Oil/resin/volatile solvent-based glues and adhesives, including epoxy, rubber cement, two-part glues and sealers, and auto body fillers.
- Water-Based Adhesives/Glues: Water-based glues, caulking compounds, grouts, and Spackle.
- Oil-Based Paint/Solvent: Solvent-based paints, varnishes, and similar products. Various solvents, including chlorinated and flammable solvents, paint strippers, solvents contaminated with other products such as paints, degreasers and some other cleaners if the primary ingredient is (or was) a solvent, or alcohol such as methanol and isopropanol.
- Caustic Cleaners: Caustic acids and bases whose primary purpose is to clean surfaces, unclog drains, or perform other actions.
- Dry-Cell Batteries: Dry-cell batteries of various sizes and types as commonly used in households. Includes cell phone and button cell batteries. Distinguish between single use batteries and rechargeable batteries.

Hazardous and Special Wastes (2)

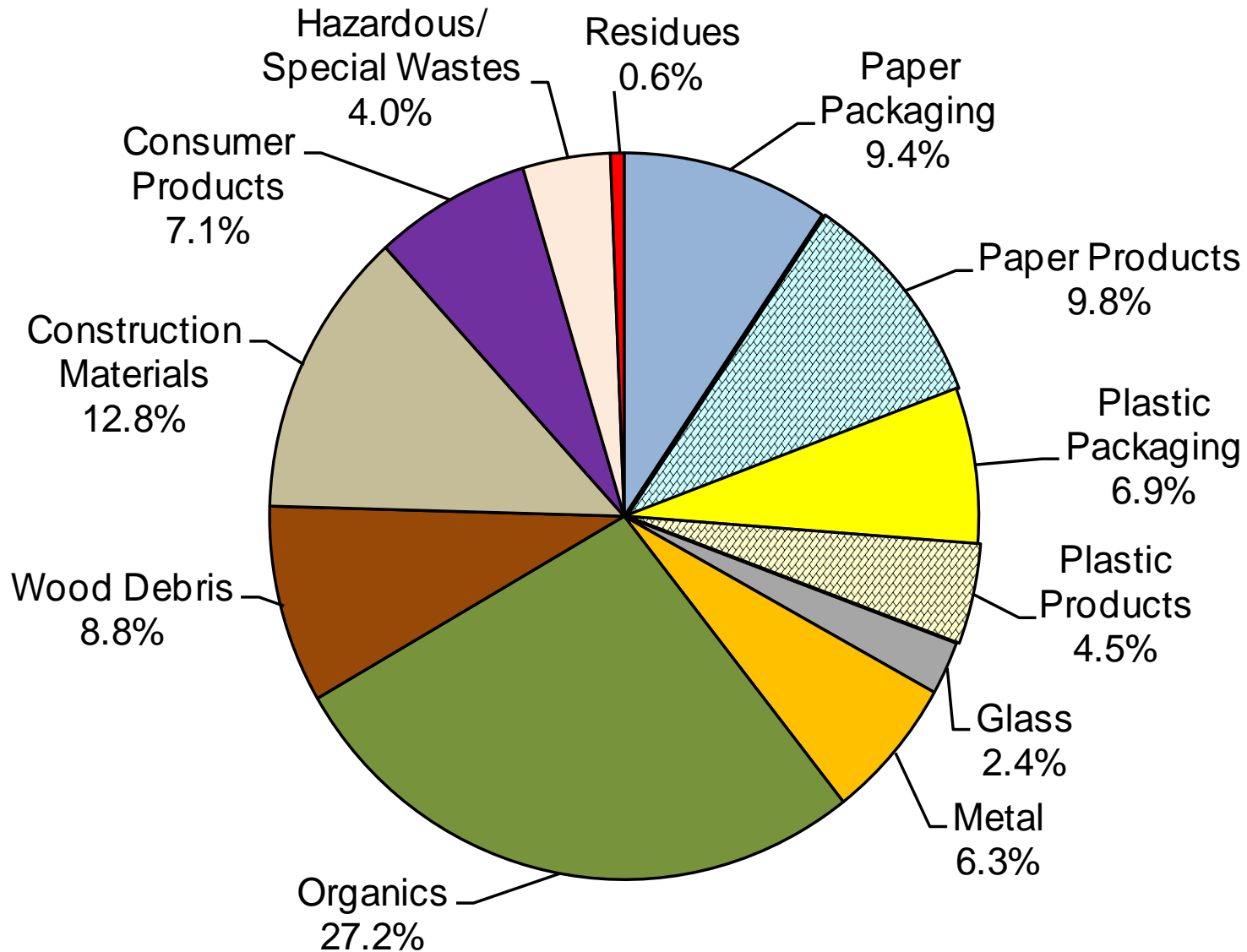
- Wet-Cell Batteries: Wet-cell batteries of various sizes and types as commonly used in automobiles.
- Gasoline/Kerosene: Gasoline, diesel fuel, and fuel oils.
- Motor Oil: Lubricating oils, primarily used in vehicles but including other types with similar characteristics.
- Antifreeze: Automobile and other antifreeze mixtures based on ethylene or propylene glycol.
- Other Vehicle Fluids: Includes brake, power steering, and hydraulic, and transmission fluid.
- Oil Filters: Used oil filters, primarily those used in cars but possibly including similar filters from other types of vehicles and other applications.
- Explosives: Gunpowder, unspent ammunition, picric acid, and other potentially explosive chemicals.
- Medical Wastes: Materials typically discarded in a health care setting such as I.V. tubing and patient drapes, specimen containers, and Petri dishes. Medical wastes that could be considered a biohazard are weighed, but not further sorted.
- Pharmaceuticals and Vitamins: Not including the container. Classify container according to material type.
- Disposable Diapers: Disposable baby diapers and protective undergarments for adults (including feminine hygiene products).
- Other Cleaners/Chemicals: Soaps, non-caustic cleaners, medicines, cosmetics, and other household chemicals.
- Other Potentially Hazardous Wastes: Other chemicals or potentially harmful wastes that do not fit into the above categories, including unidentifiable materials.
- Other Non-Hazardous Waste: Problem wastes that do not fall into one of the above materials, but that are not hazardous, weak acids and bases (cleaners), automotive products (car wax, etc.)

Statewide Disposed Waste Composition Detail

Material	Est. Percent	+ / -	Est. Tons	Material	Est. Percent	+ / -	Est. Tons
Paper Packaging	9.4%		469,574	Paper Products	9.8%		490,049
Newspaper Packaging	0.2%	0.3%	12,088	Newspaper	1.4%	0.4%	70,594
Cardboard/Kraft Paper Packaging	3.7%	0.8%	185,311	Cardboard/Kraft Paper Products	0.1%	0.0%	3,894
Other Groundwood Paper Packaging	0.1%	0.1%	7,344	Magazines	0.9%	0.3%	46,149
Mixed/Low Grade Paper Packaging	2.6%	0.4%	130,662	High-Grade Paper Products	1.0%	0.3%	49,667
Compostable Paper Packaging	1.2%	0.4%	58,191	Other Groundwood Paper Products	0.3%	0.2%	13,874
R/C Paper Packaging	1.5%	0.5%	75,979	Mixed Low Grade Paper Products	1.6%	0.3%	81,068
				Compostable Paper Products	4.1%	0.9%	201,801
Plastic Packaging	6.9%		345,235	Paper Processing Sludge	0.0%	0.0%	0
#1 PETE Plastic Bottles	0.7%	0.1%	33,344	R/C Paper Products	0.5%	0.3%	23,003
#1 PETE Plastic Non-bottles	0.3%	0.1%	14,563				
#2 HDPE Plastic Natural Bottles	0.3%	0.0%	12,547	Plastic Products	4.5%		222,910
#2 HDPE Plastic Colored Bottles	0.3%	0.0%	17,017	#1 PETE Plastic Products	0.0%	0.0%	172
#2 HDPE Plastic Jars & Tubs	0.4%	0.4%	20,020	#2 HDPE Plastic Products	0.0%	0.0%	1,883
#3 PVC Plastic Packaging	0.0%	0.0%	710	#3 PVC Plastic Products	0.0%	0.0%	1,109
#4 LDPE Plastic Packaging	0.0%	0.0%	329	#4 LDPE Plastic Products	0.0%	0.0%	116
#5 PP Plastic Packaging	0.3%	0.0%	16,732	#5 PP Plastic Products	0.1%	0.1%	3,574
#6 PS Plastic Packaging	0.5%	0.1%	22,579	#6 PS Plastic Products	0.1%	0.0%	6,068
#7 Other Plastic Packaging	0.5%	0.1%	26,282	#7 Other Plastic Products	1.3%	0.3%	63,916
PLA Packaging	0.0%	0.0%	312	PLA Products	0.0%	0.0%	53
Plastic Merchandise Bags	0.5%	0.1%	24,139	Plastic Garbage Bags	1.3%	0.2%	64,784
Non-industrial Packaging Film Plastic	2.0%	0.3%	101,092	Plastic Film Products	0.3%	0.1%	13,465
Industrial Packaging Film Plastic	0.4%	0.2%	21,911	R/C Plastic Products	1.4%	0.6%	67,771
R/C Plastic Packaging	0.7%	0.8%	33,657				
				Consumer Products	7.1%		355,387
Glass	2.4%		117,970	Televisions - CRT	0.6%	0.6%	29,012
Clear Glass Containers	0.9%	0.2%	42,353	Televisions - LCD	0.0%	0.0%	0
Green Glass Containers	0.2%	0.0%	8,592	VCR's, DVD's, DVR's	0.0%	0.0%	1,646
Brown Glass Containers	0.4%	0.1%	17,490	Computer Monitors - CRT	0.0%	0.0%	1,476
Plate Glass	0.1%	0.1%	5,082	Computer Monitors - LCD	0.0%	0.0%	322
Stoneware/Kitchen Ceramics/Glassware	0.2%	0.1%	8,893	Computers	0.0%	0.0%	1,292
R/C Glass	0.7%	0.6%	35,560	Computer Peripherals	0.1%	0.1%	3,674
				Audio Equipment	0.1%	0.0%	4,109
Metal	6.3%		315,715	Gaming Equipment	0.0%	0.0%	742
Aluminum Beverage Cans	0.5%	0.1%	23,031	Other Consumer Electronics	0.6%	0.3%	30,031
Aluminum Foil/Containers	0.1%	0.0%	5,426	Textiles - Organic	1.8%	0.4%	87,471
Other Aluminum	0.1%	0.1%	5,166	Textiles - Synthetic	1.0%	0.2%	48,869
Other Nonferrous	0.1%	0.1%	5,854	Shoes, Purses, Belts	0.4%	0.1%	17,931
Food Cans - Tinned	0.7%	0.3%	35,772	Tires & Rubber	0.3%	0.1%	15,216
Food Cans - Coated	0.1%	0.0%	5,054	Furniture	2.0%	1.1%	97,620
White Goods	0.1%	0.1%	7,365	Mattresses	0.1%	0.1%	5,660
Other Ferrous Metal	2.9%	1.3%	145,220	R/C Consumer Products	0.2%	0.1%	10,317
R/C Metals	1.7%	0.7%	82,826				
				Hazardous/Special Wastes	4.0%		198,588
Organics	27.2%		1,356,253	Pesticides/Herbicides	0.0%	0.0%	253
Food - Vegetative	13.1%	2.6%	654,458	Mercury Vapor Lighting	0.0%	0.0%	0
Food - Non-vegetative	5.2%	1.6%	258,823	Compact Fluorescent Lights	0.0%	0.0%	184
Leaves & Grass	4.1%	1.5%	203,909	Fluorescent Tubes	0.0%	0.0%	64
Prunings	0.5%	0.2%	26,941	Asbestos	0.0%	0.0%	0
Animal Manure	3.2%	1.1%	159,888	Latex Paint	0.1%	0.1%	6,213
Animal Carcasses	0.3%	0.4%	12,598	Solvent-based Glues	0.2%	0.2%	7,990
Crop Residues	0.0%	0.0%	0	Latex-based Glues	0.0%	0.0%	242
Fruit Waste	0.1%	0.2%	7,395	Oil-based Paint & Solvent	0.0%	0.0%	2,086
R/C Organics	0.6%	0.2%	32,241	Caustic Cleaners	0.0%	0.0%	800
				Dry-cell Batteries	0.0%	0.0%	1,465
Wood Debris	8.8%		438,174	Wet-cell Batteries	0.0%	0.0%	207
Treated Wood	1.1%	0.7%	56,145	Gasoline/Kerosene	0.0%	0.0%	1,317
Painted Wood	1.9%	0.7%	96,883	Motor Oil	0.0%	0.0%	513
Dimensional Lumber	1.0%	0.4%	51,929	Antifreeze	0.0%	0.0%	3
Engineered Wood	1.1%	0.5%	54,324	Other Vehicle Fluids	0.0%	0.0%	77
Pallets & Crates	1.7%	1.0%	86,705	Oil Filters	0.0%	0.0%	1,545
Other Untreated Wood	0.5%	0.5%	26,916	Explosives	0.0%	0.0%	24
Wood By-Products	0.3%	0.1%	12,574	Medical Wastes	0.5%	0.3%	25,067
R/C Wood Wastes	1.1%	0.4%	52,698	Pharmaceuticals/Vitamins	0.0%	0.0%	1,343
				Disposable Diapers	2.8%	0.6%	140,020
Construction Materials	12.8%		637,619	Other Cleaners & Soaps	0.1%	0.1%	6,150
Natural Wood	0.1%	0.1%	5,147	Other Hazardous	0.0%	0.0%	1,549
Insulation	0.4%	0.4%	22,379	Other Non-hazardous	0.0%	0.0%	1,473
Asphalt Paving	0.2%	0.2%	9,676				
Concrete	0.2%	0.1%	10,917	Residues	0.6%		31,022
Drywall	2.6%	2.0%	131,475	Ash	0.2%	0.2%	7,889
Carpet	2.9%	1.8%	145,282	Dust	0.1%	0.0%	4,060
Carpet Padding	0.7%	0.8%	33,211	Fines	0.3%	0.1%	15,590
Soil, Rocks, Sand	1.2%	0.6%	58,009	Sludge/Special Industrial	0.1%	0.1%	3,483
Asphalt Roofing	1.2%	0.7%	62,215				
Plastic Flooring	0.2%	0.2%	10,054	Totals	100.0%		4,978,496
Ceramics & Brick	1.4%	1.5%	69,617	Sample Count	530		
R/C Construction Materials	1.6%	0.7%	79,639				

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Overall Statewide Disposed Waste Stream Composition by Material Class, 2009



Conventional Wisdom

- MRW is 2% of MSW waste stream (1% HHW + 1% CESQG)

Total MSW Tons	4,978,496
2%	99,570
MRW Tons Collected (2008)	15,553
Collection Rate	14%

Waste Characterization

- Subtract out: medical waste, diapers, pharmaceuticals, explosives

Total MSW Tons	4,978,496
MRW Tons	32,134
MRW Tons Collected (2008)	15,553
Collection Rate	33%

Variability in Waste Comp Numbers

- Great variability in numbers due to low incidence of finding MRW in a sample
- Additional samples from counties were added
- Examined high and low ranges

Low Range with Supplemental

Total MSW Tons	4,978,496
MRW tons	4,362
MRW Tons Collected (2008)	15,553
Collection Rate	78%

High Range with Supplemental

Total MSW Tons	4,978,496
MRW tons	13,712
MRW Tons Collected (2008)	15,553
Collection Rate	53%

EPA – 100lb. Of HHW

# of Housing Units 2009	2,837,376
HHW Pounds Generated	283,737,600
HHW Pounds Collected (2009)	22,522,113
Collection Rate	8%

EPA – 1.6m Tons Of HHW

US Population 2008	300,420,293
HHW Pounds	3,200,000,000
WA Population 2008	6,566,073
% of US Population	2.19%
Amount of HHW in WA based % population	69,940,128
HHW Pounds Collected (2009)	22,522,113
Collection Rate	32%

Range of Collection Rates

	Conven- tional Wisdom	WC Study	WC Study Low Range	WC Study High Range	EPA 100#	EPA 1.6 Million Tons
Collection Rate	14%	33%	78%	53%	8%	32%

Statewide Disposed Hazardous Waste Comp. Detail

Material	Est. Percent	+ / -	Est. Tons
Hazardous/Special Wastes	3.9889%		198,588
Pesticides/Herbicides	0.0051%	0.0060%	253
Mercury Vapor Lighting	0.0000%	0.0000%	0
Compact Fluorescent Lights	0.0037%	0.0025%	184
Fluorescent Tubes	0.0013%	0.0014%	64
Asbestos	0.0000%	0.0000%	0
Latex Paint	0.1248%	0.0660%	6,213
Solvent-based Glues	0.1605%	0.2417%	7,990
Latex-based Glues	0.0049%	0.0033%	242
Oil-based Paint & Solvent	0.0419%	0.0390%	2,086
Caustic Cleaners	0.0161%	0.0190%	800
Dry-cell Batteries	0.0294%	0.0137%	1,465
Wet-cell Batteries	0.0042%	0.0057%	207
Gasoline/Kerosene	0.0265%	0.0426%	1,317
Motor Oil	0.0103%	0.0095%	513
Antifreeze	0.0001%	0.0001%	3
Other Vehicle Fluids	0.0016%	0.0014%	77
Oil Filters	0.0310%	0.0185%	1,545
Explosives	0.0005%	0.0004%	24
Medical Wastes	0.5035%	0.3458%	25,067
Pharmaceuticals/Vitamins	0.0270%	0.0225%	1,343
Disposable Diapers	2.8125%	0.6404%	140,020
Other Cleaners & Soaps	0.1235%	0.0519%	6,150
Other Hazardous	0.0311%	0.0188%	1,549
Other Non-hazardous	0.0296%	0.0166%	1,473

Statewide Disposed Hazardous Waste Composition (with additional county detail)

Material		Est. Percent	+ / -	Est. Tons
Hazardous/Special Wastes		3.5569%		177,079
	Gasoline and Fuel Oils	0.0112%	0.0153%	556
	Vehicle & Equipment Fluids	0.0694%	0.0269%	3,457
	Vehicle Batteries	0.0154%	0.0190%	766
	Household Batteries	0.0587%	0.0080%	2,923
	Latex Paint	0.1278%	0.0565%	6,360
	Oil-based Paint & Solvents	0.0462%	0.0386%	2,301
	Adhesives and Glues	0.0410%	0.0167%	2,043
	Pesticides/Herbicides	0.0255%	0.0270%	1,271
	Medical/Pharmaceutical Waste	0.4159%	0.1775%	20,706
	Cleaners and Corrosives	0.0195%	0.0066%	969
	Diapers	2.5846%	0.2072%	128,676
	Other Hazardous/Special Wastes	0.1416%	0.0648%	7,051

2009 Washington Statewide Waste Characterization Study

(report in PDF):

<http://www.ecy.wa.gov/biblio/1007023.html>

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